Screening Test for Auditory and Visual Perception Skills for Children

Rajesh Lal R

SAERA. School of Advanced Education Research and Accreditation

ABSTRACT

Ability of reading and writing in children is an important factor in good academic performance. Academicachievement is a part of children, as they grow older. Ability to comprehend, interpret from books and different educational materials will give new ideas and information, which will help them to think and learn to live a better life. Nowadays learning disability is wide spreading to interrupt the academic performance in children.

The main purpose of this study is to develop and validate a screening instrument for measuring various aspects of auditory and visual perceptual skills in school attending children up to 8 years old. The test mainly focused on to find out any features that can lead to this problem as early as possible so that the intervention can be provided to children as early as possible. In this test, sounds,letters,words, numbers which often cause difficulties in a learning-disabled condition which have been previously identified by different researchers. This test consists of six different auditory tasks to assess auditory perception skills and five different visual tasks to assess visual perception skills. These two sensory skills play a vital role in the development of children phonological awareness and academic skills like reading, memory and attention. The study group was made of 20 eight years old children, including 10 males and 10 females, whose first language was not English, group that was used as normative data. Results showed good test reliability butthere are some limitations factors like specified age group selection; no native English speakers for testing, reduced amount of sample selection were present.

INTRODUCTION

Different researchers explained perception in several ways. Perception is the ability of an individual to represent and understand the environment with sensory information that is received with the help of sensory organs i.e., when human senses like sight, hearing, touch, smell and taste interacts with signals from the environment as defined by Schacter, Gilbert & Wegner (2011).

Neurologically,perception is defined as the process that decodes neural signals, which are recorded in the neural system and in other higher centres in the nervous system, which helps in the learning process. Perception acts as an interconnection function between the sensory organs and the higher nervous system so that the received sensory signals are stored and used as language concepts, symbols, or different symbol system for future use when it is needed. Perception function will not happen if the sensory system and cognitive system works independently rather certain aspects of the sensory or the cognitive aspect worked together to achieve multiple perceptual functions according to Sabatino (1979).

In the late 1800's perception was thought to be an explanatory process that took place when sensory information was received through sensory organs, like the eyes and ears, and its interaction with the central nervous system in order to form language concepts, different symbols in the language or different levels of language characteristics. Based on this concept Gestalt psychologists explained the term cognition.

Perception research focuses mainly to understand each and every process that is happening while the perceptual process takes place and all the procedures during the process that help in understanding perception, recognition, and action. To achieve these goals perception studies mainly focus on two aspects i.e., the psychophysical and physiological aspects.

The **psychophysical** aspect is the quantitative analysis of the relation between stimulus (which is the physical aspect) and perception (which is the psychological aspect) according to Fechner (1966). There are different ways of analysing the psychophysical aspect of stimulus perception. One of the most common way is to ask the observer to find out the differences between almost identical colourshades, whether they are same or different. One of the main features of perceptual processing is that it keeps changing as the sensory input changes, depending on the external environment in an organized and stabilized percept. Perception is the psychological outcome that is resulting from a person´s experience, which is not depended on any physical object or image or any stimulus in the receptor. Therefore, these precepts will be more reliable and more stable even there is any change in the stimulus because the result is from a stable perceptual activity (Zimbardo &Gerrig 1996).

The physiological approach to perception involves measuring the relationship between stimuli and physiological processes and between physiological processes and perception, which calculates the relationship between sensory stimuli and physiological aspect along with that the process happening between physiological and perceptual processes. When a sensory input is received, several physiological processes happen from the level of sensory system to the higher brain areas. These changes were studied

through measuring the electrical activity occurring in the nervous system and through studying the anatomical and chemical processes involved in it. The studies conducted by Goldstein (2009) stated that nervous system nerve signals play a vital role in all perception processes received through physical and chemical stimulation of sensory organs when a stimulus is received from the environment.

Nowadays, there is a wide variety of definitions and theories spinning around the concept of perception, trying to explain how the process takes place. Most of them advocate the concept of perception as the method of recognizing or awareness, organizing, collecting and storing data and interpreting of the sensory information.

Among all the perceptual skills auditory and visual perceptual skills plays an important role in academic performance in children. Forreadingskills, there are certain auditory perceptual abilities that are required in children, which includes auditory discrimination, auditory memory, auditory blending and auditory visual integration according Flower et al (1968) &McNinch (1971). Studies done by Erhardt&Duckman (2005), for the perception of visual perception function properly abilities like visual discrimination, visual sequential memory, visual closure, visual figure-ground and visual spatial relationships are needed.

If we look in to both auditory and visualperception skills, two functions that are commonly occurring in both. They are perception discrimination and perception memory. These functions work either together or independently when an information is received from the sensory organs, acquiring meaning for each other in both auditory and visual perception. There is proof of these features being isolated from the perceptual characteristic regarding vision or audition:

– Perceptual **discrimination** is the ability of an individual to identify the basic similar and dis similar features (distinctive function differences) which is present either in visual or auditory sensory information.

– Perceptual **memory** is the ability of an individual to store information for a short period or a long period whenever a sensory signal is received.

MOTIVATION

One important problem we face nowadays is the significant number of children affected by academic concerns without other limitations. Recent investigations suggest there is a lack of performance of children even when having a lot of potential. Some children show reduced functionality at some level in psychological processing which leads to poor academic performance (Fuerst& Rourke 1993; Fuchs & Fuchs 2002).

Studies done by Dechant et al. (1961) reported that both auditory perception skills and visual perception skills are important in the development of early reading capabilities in children.

Psychological abilities like cognitive processing, language processing, memory skills, problem solving strategies, attention and concept forming strategies were influenced in children learning skills, cognitive skills and dysfunction whole mental abilities (Hinshaw, 1992; Monteil et al., 1996; Parkash, 1999). In addition, cognitive abilities like organizing, identifying and transfer function plays an

important role in perception, along with perceptual abilities like sequencing, discrimination and coordination (Rourke, 2005).According to Nakra et al. (1997), some children show difficulties processing the sensation when they have problems in perceptual functions like visual, auditory, tactile or kinaesthetic function (Nakra et al, 1997). As result of visual and auditory perceptual function disruption children show problems replicating letters correctly and telling whether sounds like a door bell and a telephone ring are different or not.

Aim of the study:

To develop a screening test to assess auditory and visual perception skills in boys and girls of same age group.

Objectives of the study:

a. To assess the auditory perception skills and visual perception skills in school going normal children.

b. To compare the auditory and visual perception skills among boys and girls.

The objective of this study is to develop a screening test that will assess the auditory and visual perception skills in school attending children, and see if there exist differences between boys and girls.

LITERATURE REVIEW

Perception is a psychological process in discovering the meaning of a sensation. It organizes, categorizes, and interprets auditory, visual, and tactile stimuli. Perception is an area of psychology, which deals with functioning of sensory systems, which helps in interpretation of information or stimulus that is received from the external world according to (Erhardt&Duckman, 2005).

According to Scott (2003), brain plays an important role in perception process through processing and creating meaningful information that is received from the sensory organs via sensory nerves. One of the important characteristics of perception is selective function, which means that it uses only the information that is needed for a particular perceptual process and eliminates rest of the information. This information, which was collected from the external environment with the help of sensory organs, is the basis for early learning skills (Groffman, 2006). In order to collect this information, one must have attention skills, so attention plays a vital role in perception (Gordon, 2004).

Perceptual learning is the improvement of sensory abilities in see, hear, feel, taste or smell through repeated experiences. These experiences can lead to permanent, or partially permanent, improvement in sensory skills depending on the number of occurrences of that particular skill in an individual´s life which ultimately help in improving a weak sensory skill making it stronger (Joshua & Takeo, 2010.). In school attending children, the auditory, visual, tactile and kinaesthetic perception skills play a vital role in their academic performance (Dednam, 2005; Retief &Heimburge, 2006). Among these elements, auditory and visual perception skills perform the crucial role in academic performance in school going children. According to Hammill &Bartel (1975), auditory perceptual techniques as those brain operations that involve decoding and organizing the physical elements of the auditory stimulus rather than the symbolic factors of the auditory stimulus. Visual

perceptual techniques as those brain operations that involve decoding and organizing the physical elements of the visual stimulus rather than the symbolic factors of the visual stimulus.

AUDITORY PERCEPTUAL SKILLS

Auditory perception is the ability of an individual to receive information from the environment with the help of the auditory system, send it to higher brain centres with the help of the auditory nerves and process it at brain level.

There are not many studies supporting auditory perception compared to those supporting visual perception. Some studies support that auditory perception measures help in identifying reading skills in children compared to that of visual perception measures (Blank, 1968; Linder &Fillmer, 1970; Muehl &Kremenak, 1966). Some studies state that auditory perception skills play an important role in the early development of language skills and early academic performance, especially in reading skills. In order to acquire proper reading skills, a sequence of auditory perceptual abilities are required. These skills have to be acquired earlier before starting to read by children so that it can help in improving reading skills. If children fail to master these skills before the moment they learn how to read, that will stop the foundation for mastering reading and language related skills.

The hierarchical order in auditory perception includes auditory discrimination, auditory memory, auditory blending, auditory comprehension, auditory visual integration and auditory sensitivity by Flower (1968). Strang (1968) and Wepman (1967) did similar studies. McNinch (1971) also supports the idea that these sequential abilities were needed in order to achieve reading skills.

Auditory perception plays a vital role in children development in normal acquisition of fundamentals of language skills, academic performance skills like reading skills, overall school readiness skills. Auditory perception skills like discrimination, memory, closure and sound blending play a vital role in academic performance in children.

Auditory discrimination is the ability of an individual to identify the presence of a given sound in a sequence of sounds and the potential to differentiate amongst similar sounds. Many researchers have observed that ability in auditory discrimination correlates reasonably with reading success (Benger, 1968; Morency, 1968; Oakland, 1969; Peck, 1977; Wepman, 1960). It is commonly thought that a minimal level of auditory discrimination is essential for the normal acquisition of reading and common verbal skills (Deutsch, 1964; Zigmond, 1969).

Auditory sequential memory is the ability of an individual to store a sound sequence in the memory for a brief period of time and retrieving that sequence of sound after a particular period.

Auditory memory and auditory sequential memory play a vital role in readings skill according to some researchers (Badian, 1977; Boyd & Butler, 1971;Morency, 1968; Peck, 1977; Poling, 1953), so if there is any impairment in these memories it will affect reading skills in children (Hirshoren, 1969; Kirk, 1968; Rugel, 1974; Witkin, 1969).

Auditory comprehension is the ability to understand an auditory signal and retrieve it back orally, whereas auditory-visual

comprehension -is the ability of an individual to create a relation between an auditory signal and graphical representation of that signal.

Researchers do not give much importance to auditory closure and auditory blending perceptual skills, some researchers like Finkenbinder (1972) state that these skills help in overall performance in reading skills in children.

For auditory perception, there are six skills present:

1. Auditory discrimination is the ability of an individual to differentiate amongst auditory stimuli. There are many professionals including speech science professionals, reading professionals studied about auditory discrimination (Dykstra, 1966; Winitz, 1969). The studies of auditory perception focused more on auditory discrimination compared to that of auditory blending and auditory closure (Witkin, 1971). There many research studies that greatly support a correlation between auditory discrimination and reading achievements (Benger, 1968;Morency, 1968;Oakland, 1969).

Some investigations show that auditory perceptual measures help in understanding the ability children-reading fulfilment than compared to that of visual perceptual measures (Blank, 1968; Linder &Fillmer, 1970; Muehl &Kremenak, 1966). A study from Nila*et al* also supported that visual discrimination does not play an important role in reading skills compared to that of auditory skills(Peck, 1977;Wepman, 1960). Deutsch (1964) andZigmond (1969) stated in their study that there is needed a basic level of auditory discrimination for common verbal abilities and normal acquisition of reading abilities in children. According to Barrett´s studies in first grade children there is a relationship between pre-reading discrimination skill and reading skills like letter reading, word matching, numbers, copying skills were noticed which the visual discrimination perception skills are. Some studies done by Goins and Ryan state that visual perception skills are important in the development of early reading skills in children. Studies done by Durrell (1956), Wepman (1960), McGrady& Olson (1970) stated that poor auditory discrimination leads to poor reading skills and show poor academic performance

2. Auditory sequential memory: It is a part of memory, memory is the ability of an individual to retrieve previously stored information whenever is needed. Memory stores the overall information in the storage rather than going into detailed aspect. Auditory memory plays a vital role in children, if there is any problem retrieving information from both short and long-term memory, which will affect the overall learning process (Wallace & McLaughlin, 1975). Auditory memory consists of the subskills of span (number of stimuli retained) and memory for sequence (retention of stimuli in serial order). Auditory sequential memory is the ability of an individual to store a sound sequence in the memory for a brief period of time and retrieving that sequence of sound after a particular period. It stores auditory signals into smaller chunks of auditory signals so that whenever is needed it can retrieve it easily.

3. Auditory blending: is the ability of an individual to identify different sounds separately and combine them together to form a meaningful word. During the process

of reading, anindividual decodes the sounds and connect them to form words in sentence. From first grade to fourth grade children, auditory blending plays a vital role in oral reading and silent reading skills according to Chall (1963). Similar studies done by Richardson & Bradley (1977), stated that first grade children show good correlations in auditory blending skills and performed better compared to other auditory perceptual skills.

4. Auditory comprehension: is the ability of children to understand auditory signals and respond back depending on that via auditory mode or motor mode.

5. Auditory figure ground: is the ability of children to carefully attend to the specific stimulus and not get distracted by background stimuli.

6. Auditory closure: is the ability of children to complete an inaudible word sound to create a clear auditory sound by connecting the words with the best possible sound from the memory.

The auditory system

The auditory system is the system that helps an individual to hear the sounds from the external environment. There are many structures involved in the process of hearing and specifically three parts are involved in hearing from the external environment to brain level for perception. The first part consists of:

– External ear, which consists of the pinna and ear canal, which help to collect sound signals from the external environment. The ear canal, which is an S shaped structure, collects the sounds from the pinna and sends them to the following part.

– Middle ear, which consists of the eardrum and small ossicles. With the help of the eardrum, which is connected to the inner ear canal end, converts the sound signals to mechanical vibrations and with the help of ossicles it is transferred to the next part.

– Inner ear, where the main part of this structure is the cochlea, which is connected to the ossicles from the middle ear and converts the mechanical vibrations into wave formations inside the cochlea with the help of fluids that rub the hair cells. This creates neural impulses in the nerves that are connected to the cochlear hair cells.

In the second part of the auditory system, the auditory nerve is present, which starts from the nuclei of hair cells and extend to the auditory cortex in the brain. From the auditory nuclei, it moves towards the superior olivary complex, from there it moves upwards and connects to the lateral lemniscus, from theresome fibres cross over happens in connections, and from there it moves upward and connects to the inferior colliculus.

Finally, the fibres move upward in the level of brain stem to the medial geniculate body in the thalamus and then it connects to the third part.

The last part is the auditory cortex, which is situated in the posterior portion of the superior temporal gyrus (Woods et al., 2009) where the auditory neural impulses are to be processed for further perception features and sent to other areas of the brain.

Visual perception

Visual perception is the ability to use visual information to recognize, recall, discriminate and give meaning to what the eyes see, and if needed to provide a suitable motor or

verbal response which holds meaning for the individual as well as the individuals receiving it. Thus, the individual sees language written structure, interprets the symbols, and is able to read with meaning. Visual perception helps individuals to observe various forms of the complexity of interpretation of images (Loikith, 2005). According to Beery (1997; 2006), visual perception is the interpretation of visual stimuli, the intermediate step between simple visual sensation and cognition.

Visual perception allows individuals to interpret and make correct judgments of the size, configuration and spatial relationships of objects in their surroundings (Frostig 1964; Kranowitz, 1998; Schneck, 2005). Visual perception and visuospatial skills help in the development of basic numerical abilities (Geary, 1993; Lonnemann, Krinzinger, Knops, &Willmes, 2008). In an earlier study, Kavale (1982) performed a meta-analysis of 161 major studies relating visual perception and reading performance. His results indicated that visual perception is a significant correlate of reading achievement, and is predictive of reading performance in school, especially during the preschool and primary school grades (1982).

There are a lot of theorists who have identified categories of visual perception, which are viewed as separate, even though inter-related entities are their (Frostig, Lefever, & Whittlesey, 1966). The visual perceptual categories recognized by theorists are given below in accordance to the terminology used in existing tests of visual perception and refer to reading (Beery, 1997; Fisher, Murray, & Bundy, 1991; Gardner, 1996; Hammill, Pearson, &Voress, 1993). This is essential for the current study because letters and numbers identification and reversal letter reversal and numbers are assessed in a variety of visual perceptual contexts associated to reading and mathematics.

There are five competencies present for visual perception:

1. Visual discrimination, which is the ability to differentiate or understand similarities and differences (distinctive features) in forms, shapes, symbols or objects (Edwards, 1987b; Grove &Haupfleisch, 1978; Todd, 1999) like matching or differentiating colours, shapes, numbers, letters, and words (Kranowitz, 1998). An important part of visual discrimination is being capable of differentiating between pictures or words (Kirk et al., 2000; Levine, 1991; Todd, 1999). Visual discrimination is described as the capacity to detect features of stimuli for recognition (ability to understand fine aspects and relate them to memory), matching (identification of stimuli that are similar) and categorisation (grouping of stimuli primarily based on their common characteristics) according to (Schneck, 1996; Todd, 1999).

So visual discrimination is the capability to visually differentiate (identify) small variations between similar looking forms such as letters, shapes, symbols or objects in order to make sense of the written word or numbers.

2. Visual memory, which is the ability to retain and recall visual experiences (Todd, 1999). There are 3 approaches in visual memory according to Todd (1999):

– Register, which is the ability to attend to information for it to be stored

– Coding, which is understanding and structuring information

– Retrieval, which helps in discovering information stored in long-term memory

Visual short-term memory stores the information perceived by the eyes (sensory memory) were information is held for few seconds (Edwards, 1987b; Grieve, 2000; Loikith, 1997). Long-term memory maintains information for durations from a few minutes to years (Grieve, 2000). So short-term memory is used actively when learning letter and number direction, learning to read, write and calculate and long-term memory is used for recalling learned spelling, story lines, tables and simple mathematical rules.

Visual sequential memory is described as the ability to remember things in the correct sequence order in which they were perceived or (Edwards, 1987b). Research (Gardner, 1996) noted that visual sequential memory is the ability to remember and recall a sequence of forms in the right sequence that was visually presented. Visual sequential memory can be defined as the capability to remember a series of objects presented visually in the correct consecutive order and which is used by children while reading, spelling and following instructions or when solving mathematical formulae.

3. Visual spatial relationships, is the ability to understand or otherwise react to the size, distance, or depth aspects of the environment (Chan, 2010). Different parts of picture perceived in relation with each other are not perceived simultaneously, but in temporal sequence and integrated into a total picture (Grove &Haupfleisch, 1978).

The main areas of brain responsible is right cerebral hemisphere which is associated with the function of visual spatial relationship perception (Fisher et al., 1991).Edwards (1987a) stated that the child learns about the relationships between objects and between objects and him/herself leading to the development of the perception of spatial relationships in a three-dimensional space. According to Levine (1991), children acquire spatial orientation concepts in the developmental sequence of vertical dimension first, followed by horizontal, and lastly oblique and diagonal dimensions.

In summary, spatial relations can be defined as the perception of the relationship between or more objects in relation to the person and in relation to each other in or three-dimensional space. Thus, visual spatial relationships would have an influence on the way we read and write letters, words and numbers, as the orientation of the letters and numbers is specific to the function on the page and to the surrounding letters and numbers on the page.

4. Visual figure-ground. The human brain has the ability to decide which stimulus should be focused on and ignore the rest of the stimuli which is not needed any that focused stimuli become the centre of attention, from a group of incoming stimuli. The focused stimuli will form the figure in the person's perceptual field, whereas the majority of stimulus will be less perceived and left in the background (Frostig& Horne, 1964; Grove &Haupfleisch, 1978; Kranowitz, 1998; Schneck, 2005).

An object cannot be perceived accurately unless it is perceived in relation to its background (Frostig& Horne, 1964). Figure-ground is the ability to see specified figures even when they are hidden in confusing, complex backgrounds according to Hammill

et al. (1993), as well as Kirk & Gallagher (2000). Additionally, children learn to focus visually on selected details in the surroundings and to cut out irrelevant information (Edwards, 1987b).

In summary, figure-ground is the ability to attend to meaningful visual stimuli while ignoring the surrounding visual stimuli. Poor visual figure-ground will result in difficulty in isolating letters and numbers in order to identify them and use them meaningfully when reading or performing mathematical calculations.

5. Visual closure, which is the capability to recognise the whole when only a part of it is, viewed (Hammill et al.,1993; Kirk et al., 2000; Schneck, 2005). Therefore, visual closure can be described as the ability to identify the entire form, object from a partially completed form, or object. This ability would allow a child to synthesise letters spelled out to form a whole word, assist the child in spelling correctly and completing sentences and mathematical equations.

The visual system

The neurophysiological method of visual perception is extremely complex, involving many areas of the cerebral cortex, thalamus, cerebellum and limbic system. The visual stimulus for the visual perceptual process is derived through the eye, cortex and the associated areas. After receiving perceptual input in the form of light reflected from physical objects, the photoreceptors (or light receptor cells, i.e., cones and rods), which is located at the level of the retina which collects the light energy captured by their receptive fields. Then they will convert it into an electrical signal, transmitting it to the lateral geniculate nucleus through the optic chiasm.

The visual stimulus transferred by the retina to the lateral geniculate body ganglion cells innervated by cones transmits the carried signal to the parvocellular layers at the dorsal LGN (Kaplan, 2005).This encoded visual signal at the level of P neurons will transmit the signals to primary visual cortex layer via optical radiations (Livingstone & Hubel, 1988; Casagrande &Kaas, 1994).When it reaches the primary visual cortex, the information is also carried to areas 18 and 19 (which are located in the occipital lobe) for higher level processing.

The geniculostriate system, which includes fibres going from the lateral geniculate body to the primary visible cortex, is responsible for discriminating form and figure ground, which contributes to visual memory. If we look in to physiological process of visual-spatial relations the stimulus is primarily perceived by the fibres running through the greatest colliculus or the tectal system and features constituting the object such as colour, motion, and surface texture are encoded (Desimone & Duncan, 1995).

MATERIALS AND METHODS

This study has primarily focused on the administration of a screening test to 20 school attending children in order to evaluate their auditory and visual perception skills. The test is focused on to collect normative data for auditory and visual perception skills in children. The materials used for this test were different picture charts and auditory sounds, which is presented via headphone along with iPad. For the assessment of auditory perception skills, six different levels were assessed with the help of auditory

stimulus presented with the help of computer and headphone. (a) Auditory discrimination (b) auditory memory (c) auditory blending (d) auditory comprehension (e) auditory figure ground (f) auditory closure.

For the assessment of visual perception skills, five different levels were assessed with the help of flash card with different figures. The skills are (a) visual discrimination (b) visual memory (c) visual closure (d) visual Figure-ground (e) visual spatial relation.

Subjects of study

The study was conducted on 20 eight years old children. Participants were divided in two groups: Group 1, where all participants were boys and Group 2, where all participants were girls.

Inclusion criteria were:

– Good communication with English.

– Goodauditory and visual abilities.

– 8 years of age.

– Having average academic skills.

Exclusion criteria were:

– Subjects having any auditory and visual pathologies.

– Poor academic skills.

Test administration

1. Test environment

The testers carried out in a quiet room in the school environment so that their will not be any distractions while administering the test.

2. Procedure

Relevant biological information that is requested from the learner:

1. Gender
2. Age
3. Home language
4. Relevant background information

The Auditory and visual perception-screening test is divided into four sections with individual subtests.

Consent to undertake the proposed research study

The researcher to obtain formal consent to proceed with the proposed research study approached the parents/caregivers. The researcher telephonically approached the community school and requested permission from the school principal.

Instructions

Selected subjects were instructed in Swedish language, as it was their native language and were informed that the screening test was going to take approximately 30 minutes for its completion. Therefore, you have to sit on the chair and close your eyes and relax so that to minimize the body movements while acquiring the data for participants. You do not need to listen to the sound stimulus presented via speaker. If any discomfort present, please inform.

Results and discussion

The objective of this study has two parts. The first objective was to find out the reliability of the test and the second objective was to find out the validity of the test. It will be done with SPSS.

The main aim of this study was to develop a test to assess the auditory and visual perception skills in school going children. For the purpose of this test, school going children were taken with no neurological conditions, children with normal auditory and visual skills and selected children having average academic performance so that the results that were obtain will be consistent and reliable. The raw scores of auditory perception skills are given below for 10 boys and 10 girls.

(See Table 4.1.) (SeeTable 4.2.) (See Table 4.3.) (See Table 4.4.) (See Table 4.5.) (See Table 4.6.) (SeeTable 4.7.) (SeeTable 4.8.) (See Table 4.9.) (See Table 4.10.)

Alpha by Lee Cronbach in (1951) providesthe measurements of the internal consistency of a test or scale, which is calculated as a number between zero and one. Internal consistency explained that describes that all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test. Internal consistency should be determined before a test can be employed for research or examination purposes to ensure validity.

The reliability is done through finding the Cronbach alpha scores.

Very highly reliable.	> 0.90
Highly reliable.	0.80–0.90
Reliable.	0.70–0.79
Marginal/minimally reliable.	0.60– 0.69
Unacceptably low reliability.	< 0.60

From the table 4.5 shown that auditory perception skills came in between 0.60 – 0.69, which is marginal level of reliability.

From the table 4. 10 shown that visual perception skills came under 0.60 which means low reliability.

T -test was also done to compare the scores of two groups as shown in the table 4.4 and table 4.9 for each test category. The results are within the range of -2 to +2. This indicates that there is not much difference present in both genders.

SUMMARY AND CONCLUSION

For the test, children of age 8 years were selected because at this point the critical period is finishing and a typically developing child will be able to respond correctly in both auditory and visual perception tasks.

Some limitations are present in this study. One of them is the number of test subjects. As the number of test subjects increases, the reliability and the validity of the test material will be better. The second limitation is language:English is not the primary language for the selected sample. This can affect in the results that are obtained from the tasks. The third limitation is the number of tasks that was given while testing each parameter. As the number of tasks increases, the test will be more accurate.

In the future, the test should overcome all the limitations that are explained above so that the screening test will be more reliable and accurate for auditory and visual perception in school going children.

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APPENDIX

Table 4.1. *Raw scores of auditory perception skills are given below for 10*

Number of boys	Auditory discrimination	Auditory memory	Auditory blending	Auditory comprehension	Auditory figure-ground	Auditory closure
1	2	2	2	3	3	2
2	3	3	3	3	3	2
3	2	2	3	3	3	2
4	2	2	2	3	3	2
5	3	2	3	3	3	2
6	2	3	3	3	3	2
7	3	2	3	3	3	2
8	3	2	3	3	3	2
9	3	3	3	3	3	3
10	3	3	3	3	3	3

Table 4.2. The raw scores of auditory perception skills is given below for 10 girls

Number of girls	Auditory discrimination	Auditory memory	Auditory blending	Auditory comprehension	Auditory figure-ground	Auditory closure
1	3	3	3	3	3	3
2	2	3	3	3	3	2
3	3	3	3	3	3	3
4	2	2	3	3	3	2
5	3	3	3	3	3	2
6	3	2	3	3	3	3
7	3	3	3	3	3	2
8	3	3	3	3	3	2
9	3	3	3	3	3	3
10	3	3	3	3	3	2

Table 4.3. *Comparing the results obtained for boys and girls for each sub test of auditory perception skills*

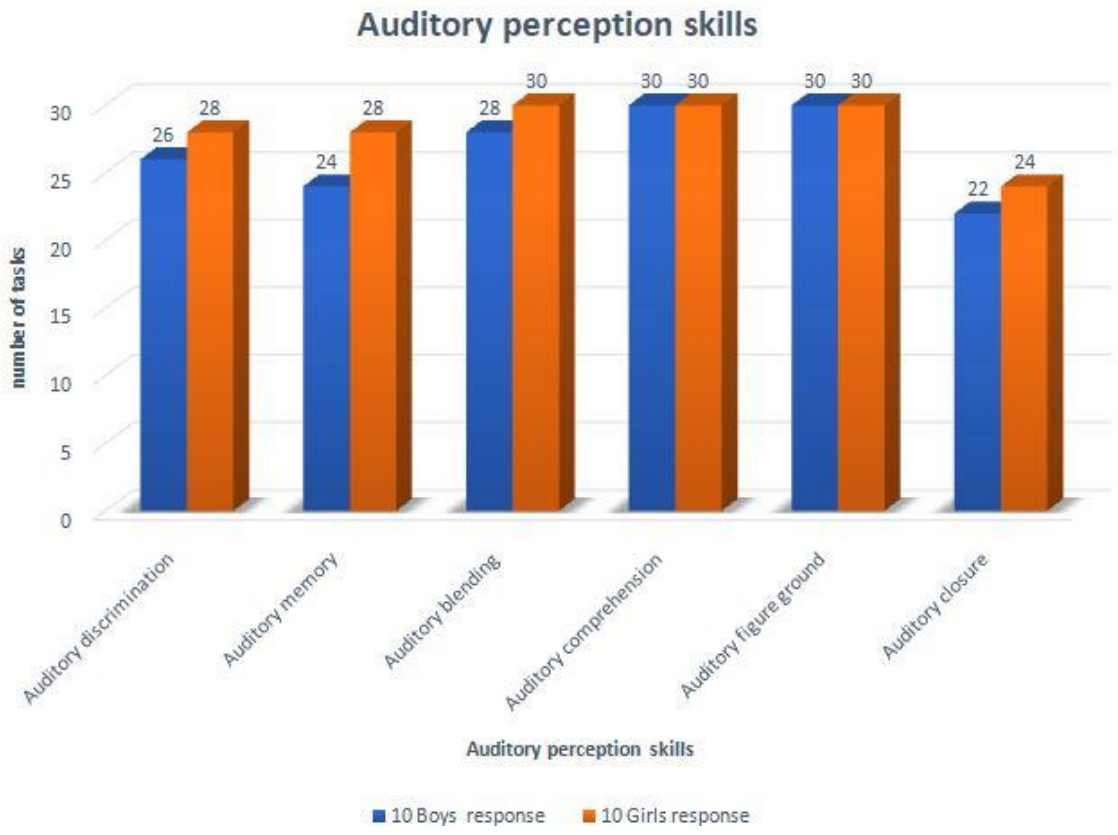

Table 4.4. *Mean and SD for auditory perceptual skills for boys and girls separately and together*

Auditory perceptual skills	Mean and SD (boys)	Mean and SD (girls)	T -value
Auditory discrimination	MEAN = 2.6 SD = 0.51640	28, MEAN= 2.8 SD = 0.42	-1.000
Auditory memory	MEAN = 2.4 SD = 0.51640	28, MEAN =2.8 SD = 0.42	-1.809
Auditory blending	MEAN=2.8 SD =0.42164	30, MEAN = 3 SD =0	-1.5
Auditory comprehension	MEAN= 3 SD = 0	30, MEAN = 3 SD =0	0
Auditory figure ground	MEAN= 3 SD =0	30, MEAN =3 SD =0	0
Auditory closure	MEAN= 2.2 SD =0.42164	24, MEAN =2.4 SD =0.52	1.000

Table 4.5.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.688	.701	4

Table 4.6. *The raw scores of Visual perception skills is given below for 10 boys*

Number of boys	Visual discrimination	Visual memory	Visual closure	Visual figure- ground	Visual Spatial skills
1	3	2	3	3	3
2	3	3	3	3	3
3	3	2	3	3	3
4	2	2	3	3	2
5	3	2	3	3	2
6	2	3	3	3	3
7	3	3	3	3	3
8	3	3	3	3	3
9	3	3	3	3	3
10	3	3	3	3	3

Table 4.7. *The raw scores of Visual perception skills is given below for 10 girls*

Number of girls	Visual discrimination	Visual memory	Visual closure	Visual figure- ground	Visual Spatial skills
1	3	3	3	3	3
2	3	3	3	3	3
3	3	3	3	3	3
4	3	3	2	3	3
5	3	2	3	3	3
6	3	3	2	3	3
7	3	2	3	3	3
8	3	3	3	3	3
9	3	3	3	3	3
10	3	3	3	3	3

Table 4.8. *Comparing the results obtained for boys and girls for each sub test of visual perception skills.*

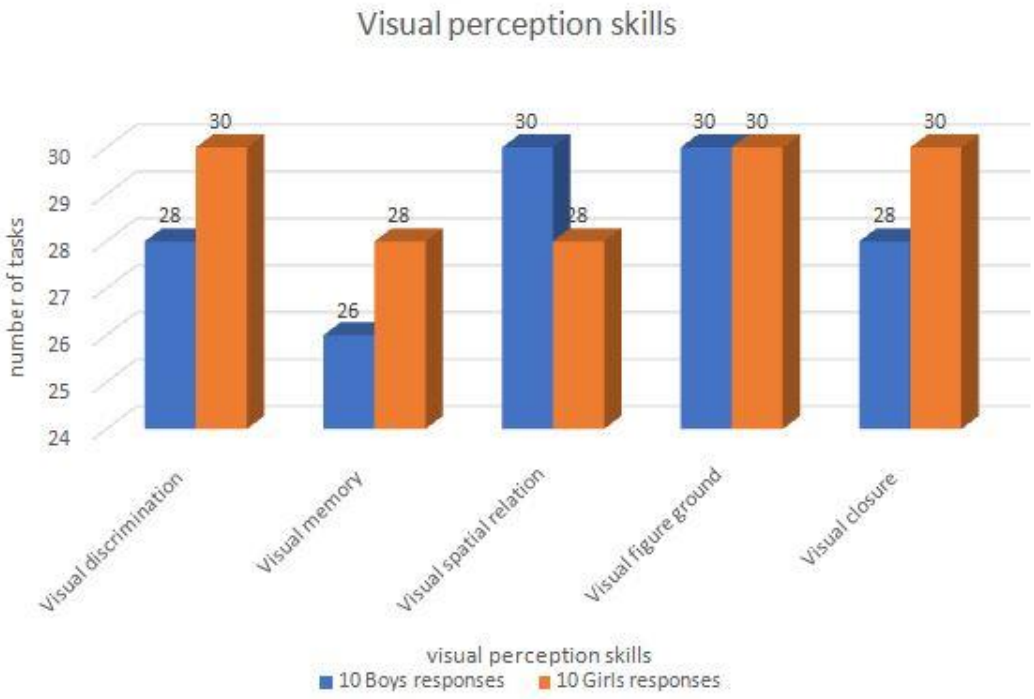

Table 4.9. *Mean and SD for visual perceptual skills for boys and girls separately and together*

Visual perceptual skills	Mean and SD (boys)	Mean and SD (girls)	T value
Visual discrimination	MEAN= 2.8 SD = 0.42	MEAN = 3 SD =0	-1.500
Visual memory	MEAN = 2.6 SD =0.52	MEAN = 2.8 SD = 0.42	-1.000
Visual closure	MEAN = 3 SD =0	MEAN = 2.8 SD = 0.42	1.500
Visual Figure-ground	MEAN= 3 SD =0	MEAN = 3 SD =0	0
Visual spatial relation	28MEAN = 2.8 SD =0.42	MEAN= 3 SD =0	-1.500

Table 4.10.

Reliability Statistic

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.571	.546